FAA AVIATION NEWS

JUNE 1971

COVER

Keeping little airlines out of the red is a big job for avionics mechanics. See page 4.

FAA AVIATION NEWS

DEPARTMENT OF TRANSPORTATION / FEDERAL AVIATION ADMINISTRATION VOL. 10, NO. 2

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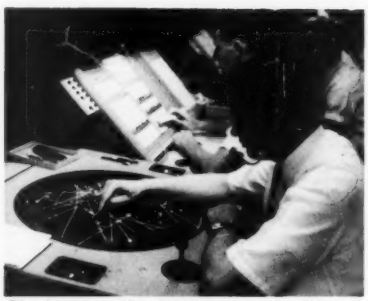

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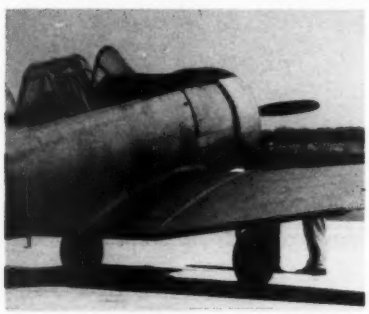

The scent of battle Page 10

John A. Volpe, *Secretary of Transportation*

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LOOK . . . before you LEASE

Editor's note:

The following material is from a pamphlet prepared at the request of the Secretary of Transportation as part of a nationwide educational program to clarify the responsibilities involved in aircraft charters or leases. While the pamphlet was directed primarily at the non-aviation segment of the public, it is reproduced here in the belief that all persons associated with aviation should be informed on this subject.

Are you or your company, school, club athletic team, fraternity, social or other group planning to charter an airplane? Fine —but before you do, take a moment to learn about chartered and leased aircraft and how to use them safely to your best advantage.

Here is what you need to know.

First of all, what is a *charter* flight? This occurs when you hire a company or organization to fly your group to a given destination. The company is obliged to provide you with a properly certificated and maintained aircraft, flown by legally proficient crewmen. In flight, the captain is in command. The company is responsible for observing all applicable safety regulations.

To legitimately engage in charter service, a company must be FAA-certificated as an Air Carrier (supplemental or scheduled), as an Air Taxi Operator, or as a Commercial Operator (usually involved in long term arrangements). Without an operator's certificate, no one may legally offer air service for compensation. A charter flight differs from other commercial air service in that all or part of the cabin seats are reserved for a private group.

The charter operator's safety certificate calls for specific maintenance, servicing and operating procedures, similar to those required of scheduled air carriers. The proficiency standards for pilots are the same as those for scheduled air carrier pilots, and aircrews are checked in flight periodically by FAA inspectors.

There are hundreds of aviation companies certificated to offer charter flying, and regulations require their safety to be of the highest order. However, there are also a few companies or individuals who have no legal operator's certificate for this purpose, and who are willing, for the sake of profit, to risk the penalty of the law by evading safety requirements. *Before you sign for a charter, ask to see the operator's FAA certificate.*

Now, what is a *leased* aircraft?

In this case, the aircraft is turned over to you or your group for whatever purposes are spelled out in the lease. Normally you would be expected to service and fly the airplane yourself, or to engage properly certificated personnel for such purposes. The important point of difference is that *when you lease an aircraft for your use, you normally become the aircraft operator.*

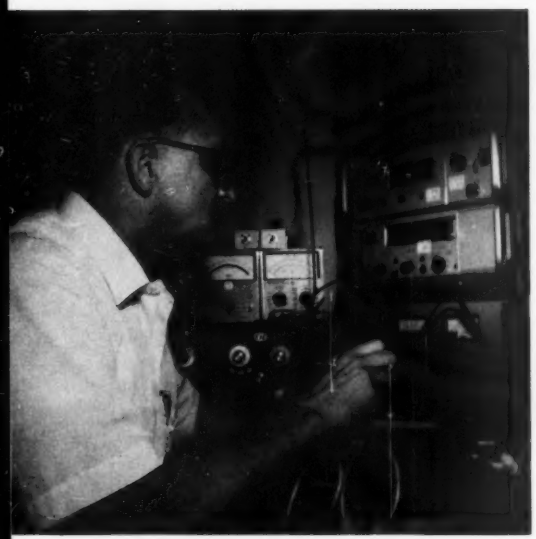
When leasing, you do not need a commercial operator's certificate as long as you do not carry persons or property for compensation or hire, but you do need to know how to maintain and operate the aircraft in accordance with the law. The minimum safety standards for leased aircraft, with regard to aircraft maintenance and pilot proficiency, are not as strict or detailed as those required for charters, nor are they subject to as frequent FAA periodic inspection. The clear intent of the law is that if you *pay* someone to transport you or your property by air, he has a greater responsibility for your safety than is the case when there is no compensation.

Leasing of aircraft is a common and thoroughly approved practice, carried out by hundreds of legitimate organizations. Unfortunately, there are some irresponsible companies which may offer to "charter" you an aircraft under the guise of providing lease services. They may use various subterfuges that confuse the issue as to who is to be the actual aircraft operator. One such subterfuge is the *sham* "dry lease," whereby you are provided with an aircraft on a lease basis, although it is actually serviced and flown by the leasing company. Such an arrangement (depending upon the terms of the lease) may make *you* the responsible operator of the aircraft, even though, in fact, you do not intend this and have nothing to do with the flight other than to indicate where and when you wish to fly.

Some groups seeking charter services may knowingly enter into an evasively worded arrangement, if the price is made attractively low. If you are tempted to do so, consider that if you accept what amounts to charter service from a company that is not certificated to operate charters, you may forego the protection of the high safety standards required by FAA. You may also be violating the law.

. If you have any doubts about the legitimacy or the safety of the charter flight you are arranging, check with the local FAA field office, listed in the telephone book under U.S. Government.

Look before you charter—or lease. ■



Mings spends his spare time developing new test apparatus to take the guesswork out of maintenance. Bench testing of "black boxes" avoids tying up expensive aircraft.

ALL in the BLUE

Happiness for a commuter airline like EXECUTIVE is an empty hangar, with all planes up and flying. Good maintenance is a key to their success.

Since Clyde Larry Mings became southern region avionics manager of Executive Airlines a year and a half ago, he has rarely experienced the luxury of a five-day work week. Most Saturdays he can be found in his laboratory at Executive's southern headquarters at Sarasota/Bradenton Airport (Fla.), where he puts his knowledge of aviation electronics to use keeping his company's fleet on the wing—and out of the repair hangar.

Larry Mings' dedication to the job is one reason why Executive Airlines has grown in five years to become the busiest commuter airline in the United States today, with 26 aircraft, 141 pilots, 428 employees and over 400,000 passengers carried in 1970. It is also one reason why, out of the 180,000 licensed aircraft mechanics in the United States, Larry Mings was chosen as the national winner in the general aviation category of the FAA's eighth annual Aviation Mechanic Safety Award for 1970.

Officially, Mings is responsible only for the avionics of Florida-based Twin Otters and Beechcraft 99's, but in practice his ingenuity enables him to range far and wide into the electrical field. To John Gibbons, maintenance manager of Executive's Sarasota office, Mings is the man to turn to whenever the company is faced with nagging recurrent problems involving electronics in any way. If there is a more efficient way to perform a function involving electronics, Mings is the man who can find it.

Larry Mings was born 47 years ago in West Frankfort, Ill. In 1941 he entered the Air Force and after a brief try in the aviation cadet program (his eyes were not up to pilot standards) he spent the next 22 years in various forms of military avionics. He flew as a radio operator and gunner on B-17s, B-29s, and transports over Europe and Africa, during and after World War II. In 1950 he shifted over to avionics maintenance and after a few years of training and experience he found himself an Avionics Superintendent in the Strategic Air Command with a staff of technicians numbering as high as 70.

When he retired from the Air Force in 1962, as a Chief Master Sergeant, he was no stranger to awards: his collection includes the Distinguished Flying Cross, Air Medal with three clusters, and the Commendation Medal. Mings now holds the rank of captain in the Air Force Reserves.

Back in civilian life, Mings soon built up an enviable reputation as a trouble shooter in the electro-mechanical field, and was hired by Executive Airlines in 1969 as avionics manager. He has a much smaller air fleet to look after than he did in SAC, and a much smaller staff (one technician), but he finds the work just as challenging. A commuter airline is able to keep "out of the red" only if its airplanes are "in the blue" (in active service) most of the time and are tied down in the repair hangar as seldom as possible.

The Challenge of Avionics

For Mings, avionics is more than a matter of making certain that communications and navigation systems are in first-class operating condition and routinely maintained—important as this consideration certainly is. It is also a continuing challenge to determine why electronics parts break down and discover how their service life may be lengthened.

Not long ago his company was plagued by a rash of failures in inverters, which are used in aircraft installations to change direct current to the alternating current required to operate flight instruments. Normally when this happened the pilot was able to switch over to a standby inverter and continue the flight without loss of instrument function, but the possibility always existed that the spare part could fail as well; in any case, the inverters were expensive to replace frequently.

After receiving assurances from the manufacturer that there were no flaws in the equipment, Mings conducted his own investigation. He observed that the inverters were positioned in the wing so that during wet weather flying conditions they became readily watersoaked and consequently could be shorted out. He went to work on the problem and devised a "rain bonnet" for the inverter that protected it from entry of moisture and did away with shorting out. His interest in inverters once aroused, Mings went on to discover that their capacitors were not capable of handling the high voltage fluctuations passing through them in normal flight, and this was also contributing to operational failures. He was able to persuade the manufacturer to redesign the unit, incorporating more suitable capacitors, and then everyone was happy.

This was not the first time Mings redesigned avionics equipment to get rid of unwelcome "bugs", or mysterious causes of instrument failure. Earlier he had been called in connection with mysterious inflight fuse failures. The Beech 99s had a panel of 10 miniature plug-in fuses, about the size of a pencil eraser, located in the nose baggage compartment, which were tied into the major avionics components—the instru-

ment landing system, communications, navigation, etc. For no apparent reason one or another of these systems would disable a fuse inflight, impairing the safety of the aircraft. Again, the manufacturers had no explanation.

Simple observation convinced Mings that the problem was functional rather than inherent. The fuses, which are quite vulnerable to contact damage, were located in such a manner that baggage handlers could easily bump against them while loading the aircraft. Also, any slight shift of baggage could bring about an impact against the fuse panel—hence the unexplained sudden inflight failures. Solution: install a metal shield over the panel to protect the fuses. Result: no more dislodged fuses in the avionics system.

There also was the *Case of the Innocent Glow Plugs*. Mings suspected that in many cases pilots who were experiencing occasional hard starts on turbo-prop engines were needlessly changing glow plugs, thinking that here is where the fault lay. Glow plugs in a turbo-prop are equivalent to spark plugs in an automotive diesel engine, igniting the fuel and air mixture; however, glow plugs stay hot after ignition to insure continuous combustion. Mings went to work and built up an electronic test mechanism that measures current and voltage through the glow plugs under operational conditions and checks out the ignition regulator circuits. Mings was convinced that in 95 percent of the cases the hard starting problems were due to other causes, mostly weak batteries.

Mings' glow plug tester was portable enough to be taken out to the aircraft and plugged into it whenever the problem occurred. Or, if time allowed, the glow plugs could be removed and tested in the shop.

The first day Mings' glow plug tester was put into operation, Executive Airlines saved over $1,000 on plugs (they cost $25 each, with two in each jet engine) which had been previously changed on suspicion, but which were actually working normally and have been ever since.

The test machine has paid for itself many times since that first day, in terms of time and equipment saved.

The tendency in maintenance work to replace equipment on suspicion—but no proof—is often a time saver, but it can be a serious cost factor. Mings' idea is to get the evidence—and thus make sure that the real culprit is being eliminated.

Not all of the problems can be remedied by mechanics. There have been times when Mings has found fault with the basic circuitry of electronics equipment and has insisted on more effective design work on the part of the manufacturer. He feels that, like the turtle, the aviation mechanic can keep his head safely within his shell and do the minimum work required of him, but if he is interested in seeing any real progress made in the industry, he has to stick his neck out once in a while.

One of the routine tasks of an avionics manager is to check out new systems in an aircraft to make certain they are functioning properly. Often this ties up the aircraft for several hours if the testing has to be done on board.

Mings came to focus his attention on the Beechcraft's annunciator warning panel, a series of 18 illuminated windows that advise the pilot of major system failures inflight. Before it could be determined whether a failure actually existed in the system, or should be ascribed to malfunctioning of the annunciator panel, the printed circuit cards for the panel had to be checked out in the airplane under conditions like those which had elicited a warning signal.

The idea of tying up expensive aircraft while these tests were being run seemed intolerable to Mings, who set to work to build a testing device that would feed into the circuits a signal identical with that produced by a failure in one of the aircraft systems under flight conditions. Soon he had a foolproof way of testing annunciator panels on the bench, in a fraction of the time previously required for such investigations.

Electronic Detection

Triumphs of this kind are very satisfying to Mings, who considers himself naturally suited to his chosen work. He recommends it highly for anyone else, including his son Eric, aged 13, who has an analytical mind and enjoys solving puzzles. Avionics, he points out, differs from some other forms of mechanics in that you are dealing with components that have no (visible) moving parts, so you have to depend a great deal on systematic reasoning—something like Sherlock Holmes on paper. Then too, airline electronic work calls for a conscientious attitude, because mistakes can also be invisible but nevertheless contribute to serious accidents.

Education for avionics begins with basic math and physics in high school and moves on to specialized courses usually provided at technical schools for aviation mechanics. For a dedicated man like Mings, the education never stops. He still frequently attends courses set up by manufacturers to familiarize the trade with new equipment.

Probably the most specialized form of avionics, requiring the most intensive training in higher mathematics, is that needed for "pulse work" (involving radar equipment, DME, radio altimeters, etc.). Ability to use a cathode ray oscilloscope is a must.

For relaxation Mings dabbles in—yes, you guessed it—amateur radio. He also loves fishing and is a backyard gardener, strictly utilitarian variety.

Mings and his family will come to Washington for the awards presentation on June 22 as guests of FAA and Champion Spark Plug Company. He will receive $150 from the Ziff-Davis Publications Aviation Division, $300 from the National Business Aircraft Association, $300 from the Aircraft Owners and Pilots Association, $200 from the National Aviation Trades Association, a $50 U.S. Savings Bond from the Professional Aviation Mechanics Association, and a three-day trip for himself and Mrs. Mings to any destination within 1,500 miles of their residence given by the Cessna Aircraft Corporation.

As the winner of the FAA's Aviation Mechanic Safety Award for the State of Florida and the Southern Region, Mings was given a set of tool boxes worth $300 from the Snap-On Tool Co. along with a $300 gift certificate.

The Mings will be flown to Washington through the courtesy of the Aviation Distributors and Manufacturers Association and the General Aviation Manufacturers Association. Larry will receive a set of specially boxed matched drives from the S-K Tool Division of Dresser Industries, plus a $50 check for his wife.

At an earlier stage in the history of aviation, avionics were regarded as "frills" rather than essential equipment. People tended to rely on the skill of the pilot and the soundness of the engine to carry a flight through safely. But today there is a steadily increasing tendency to shift responsibility over to the black boxes, the electronic circuits that back up the man and the machine, that enable the aircraft to "see" through fog and clouds, and to find its way in the dark. That is why aviation electronics has been rapidly elevated from a one-time luxury to a major science, which makes possible safe scheduled flight under conditions of near-zero visibility. M. W.

Good avionics can mean the difference between grounded flights and unbroken schedules.

REGIONAL MECHANIC AWARDS

National award winners receive a handsome bronze wall plaque

NATIONAL AIR CARRIER AWARD WINNER

Significant contributions to aviation safety and reliability were made by the fifteen proud winners in the FAA's eighth annual Aviation Mechanic Safety Awards program for 1970, who earned high honors and valuable cash and material awards. The story of general aviation's Larry Mings, who kept his company's avionics at an unusually high performance level, is told on page 4. An account of how Norman Kendig of Eastern Airlines isolated a control surface problem will appear next month.

Norman L. Kendig
10435 7th Avenue, S.W.
Seattle, Washington 98146

European Region:

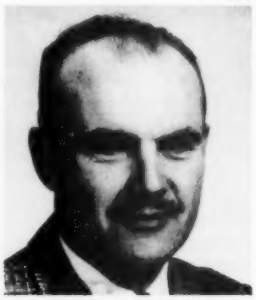
Carl G. Dincesen
Pan American
Syosset, New York

Alaskan Region:

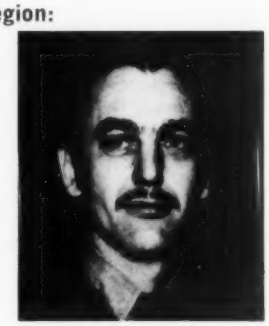
Forrest R. Jones
Anchorage Helicopter Service
Anchorage, Alaska

Stephen N. Novak
Wien Consolidated Airlines
Anchorage, Alaska

Eastern Region:

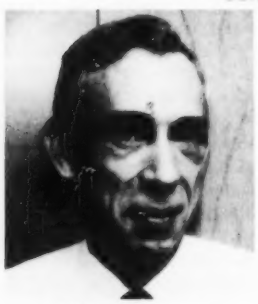


Herbert C. Willford
Dana Corporation
Toledo, Ohio



Lowell Cullison
Allegheny Airlines
Pittsburgh, Pa.

Central Region:

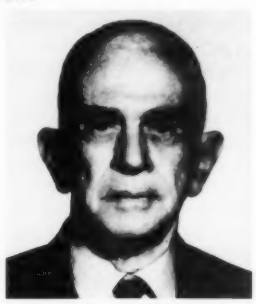


John R. Herman
Walston Aviation Inc.
East Alton, Illinois

Ray E. Vance
Ozark Airlines
St. Louis, Missouri

Pacific Region:

Daniel K. Kahawai
Aloha Airlines, Inc.
Honolulu, Hawaii



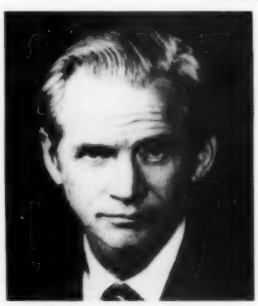
Edwin M. Walsh
Air Asia Company, Ltd.
Tainan, Taiwan

Southwest Region:

James D. Connolly
Dallas Airmotive Corporation
Dallas, Texas

Paul E. Hilburn
American Airlines
Tulsa, Oklahoma

Western Region:



Robert W. Hathaway
Santa Barbara Aviation
Goleta, California

Alfred Derochea
The Flying Tiger Line, Inc.
Los Angeles, California

INSPECTION AIDS 9

A series of articles on maintenance problems of general aviation aircraft.

Restriction of the fuel flow by fragments of plastic carburetor gasket has been known to lead to this type of upset on takeoff.

Casket Material

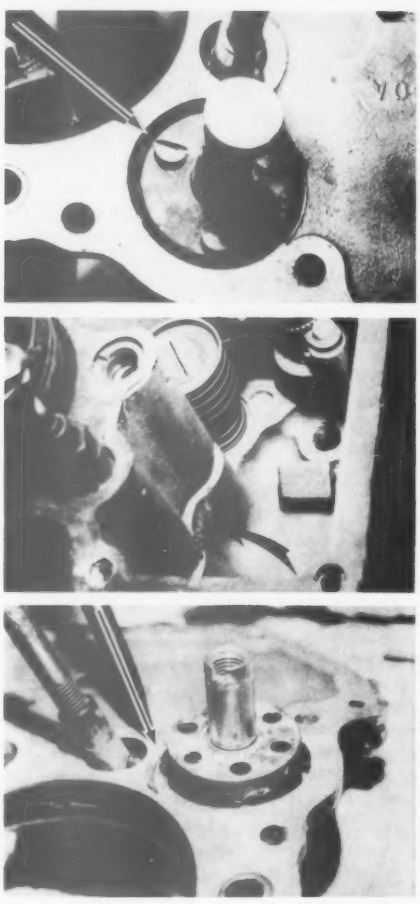
The use of unauthorized material in carburetor maintenance can have a fatal conclusion

Foreign objects are apt to enter the aircraft engine from a variety of natural sources, but occasionally their entrance is abetted by the hand of man, using the wrong material in the wrong place.

One such material is the plastic sealing compound which can be used as a makeshift gasket to seal two machined metal surfaces which have developed some irregularity—carburetor parts are a good example. Investigation of a recent engine failure due to restricted fuel flow disclosed a silicon type sealing compound had been used as a gasket during overhaul of the carburetor. Hardened and broken pieces of the compound were found scattered about inside the carburetor, including a large fragment lodged in the high-speed jet. Had the engine failure occurred during a critical phase of flight, the results could have been fatal.

The surfaces of metal facing parts which have been nicked, burred or slightly warped, so that the ordinary gasket no longer forms a perfect seal, usually need to be machined to an acceptable uniformity. The use of plastic sealing compounds are not a safe alternate solution to this problem. Such compounds should only be used as recommended by the manufacturer of the particular aeronautical product being worked on —never indiscriminately.

A "good, cheap" gasket just might spell something else for some unsuspecting pilot. Why risk it? ■



Right—arrows show location of some of the pieces of a silicon sealing compound used improperly during a carburetor overhaul. Other pieces restricted the fuel flow and caused engine failure.

GHOST RIDERS IN THE SKY

Some transponders are giving con
fits with radar returns that show
multiple targets. Standardization o
ment has been proposed.

A static-prone radio receiver or a faulty rate-of-climb indicator can be a serious problem in flight, although normally it is a problem only for the pilot involved. But a poorly functioning radar transponder is everyone's problem, because it may jeopardize the safe radar identification of many other aircraft in the vicinity of the pilot who is using it. To prevent "electronic cluttering" of the radar environment, FAA is proposing new rules which would eventually require radar beacon transponders on U.S. civil aircraft to meet prescribed technical standards of performance and compatibility with other airborne units and ground interrogators.

The FAA proposal would establish separate standards for general aviation and airline transponders. Although the use of transponders is currently required in positive control airspace and in Terminal Control Areas, the existing transponder standards are not mandatory; the new standards would be mandatory for all transponders used in flight.

Transponders installed after January 1, 1972, on aircraft not already equipped with transponders would have to meet either the air carrier or general aviation criteria, depending upon the use of the aircraft. However, aircraft presently equipped with transponders would have until January 1, 1975, to have their equipment brought up to standards, if substandard, or replaced by approved units.

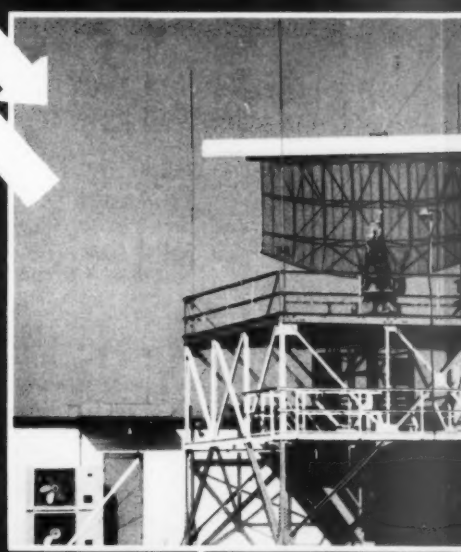
The new rule also proposes to classify transponders for use above or below 15,000 feet, with a lower output permitted for those units operating at the lower altitudes. The average difference in cost between the high and low powered transponders has not yet been determined.

Basis for the proposed rulemaking is the steadily increasing number of reports from air traffic controllers telling of difficulty in identifying transponder-equipped aircraft on the radar scope. Transponders are airborne electronic transmitters which normally give radar controllers a much more positive target on the scope than that produced by an aircraft without this equipment. Transponders are activated by the energy pulses of a compatible radar ground interrogation unit. In effect, the ground unit asks a question, electronically, and the transponder returns an answer. (This is also known as radar beacon.)

Numerous "conversations" can be conducted almost simultaneously, since the time taken for questions and answers is measured in microseconds (millionths of a second). If, by unusual coincidence, a transponder would be questioned by two separate radar stations at exactly the same instant, only one interrogation would receive a reply.

Transponders are designed so that numerical codes can be dialed in by the pilot, at the direction of air traffic control, to inform the controller whether the operation is IFR or VFR, high altitude or low, etc. The pilot may also push a button which causes his electronic signal, or target, on the radar screen to glow with increased magnitude ("squawk ident").

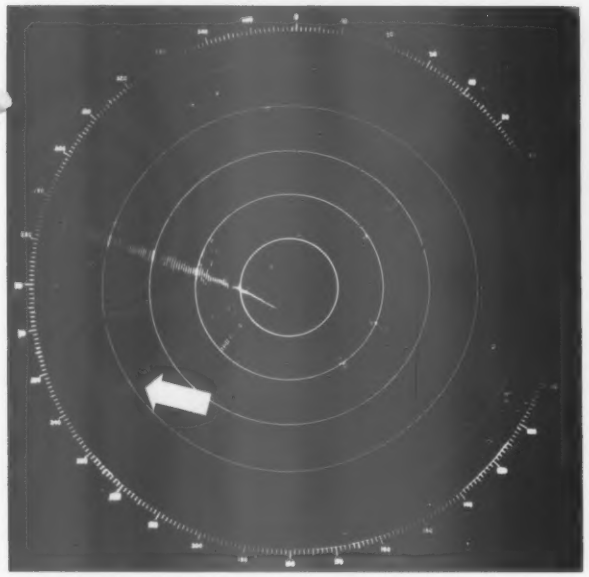
Appearing on dealers' shelves in increasing numbers are altitude encoders, or digitizers, which when coupled to the trans-



False, broken and misplaced targets complicate the job of the controller trying to keep air traffic properly spaced. At times the signal from a faulty transponder will even block out other signals.

ng controllers
show false or
ation of equip-

Ground interrogator station "questions" the transponder on one frequency and receives an answer on another. Signals of poor transponders could bounce off a nearby hangar and give a misleading target on the radar scope.



On the scope a ghost target (arrow) appears practically the same as a real one, so the controller must treat it the same. The pilot has no indication when his transponder is sending false signals.

ponder will transmit both the identity of the aircraft and/or the altitude (in 100 feet increments) directly onto the radar screen. Within the next two years many radar ground installations will be equipped to receive this discrete information.

A few years ago, when the only transponders on the market were relatively expensive, they were used primarily by the air carriers and other commercial operators. As the obvious advantages of the transponder became apparent—quick radar contact with a minimum of controller-to-pilot radio communications, larger targets on the scope for general aviation aircraft, access to positive control airspace, etc.—the transponder market mushroomed overnight. By the close of 1970 there were an estimated 40,000 transponders in use on general aviation aircraft, in addition to some 30,000 on military planes, and 2,500 on air carriers.

At the same time, radar interrogation was provided by approximately 900 ground stations throughout the country. Some 200 of these are part of FAA's air traffic system; 650 are military stations, and the remaining 50 are in miscellaneous use, such as research, manufacturing, etc.

Pilots soon had their choice of a wide range of equipment, including many low-cost transponders in the $500 to $800 category. At the same time the radar environmental clutter problem appeared and became rapidly more acute. Radar controllers began seeing "ghosts" on the radar scope. False targets, "ringaround" effect, and split, or broken targets are now common complaints. Less obvious but nonetheless serious problems involve receiver deficiencies or a tendency to return insufficient or excessive data to the ground station. Incidentally, the cheapest models are not necessarily the poorest performers in the radar environment.

For maximum efficiency and safety in the air traffic system, all transponders in use must have operating characteristics that are fairly uniform, consistent, and compatible with ground interrogator facilities. The proposed rule is intended to define and establish such standards, which are based on recommendations of the Radio Technical Commission for Aeronautics, a joint Government/industry coordinating body in the communications field.

For general aviation, the standard will be limited primarily to satisfying specified conditions of temperature, altitude, humidity, shock vibration and power input voltage.

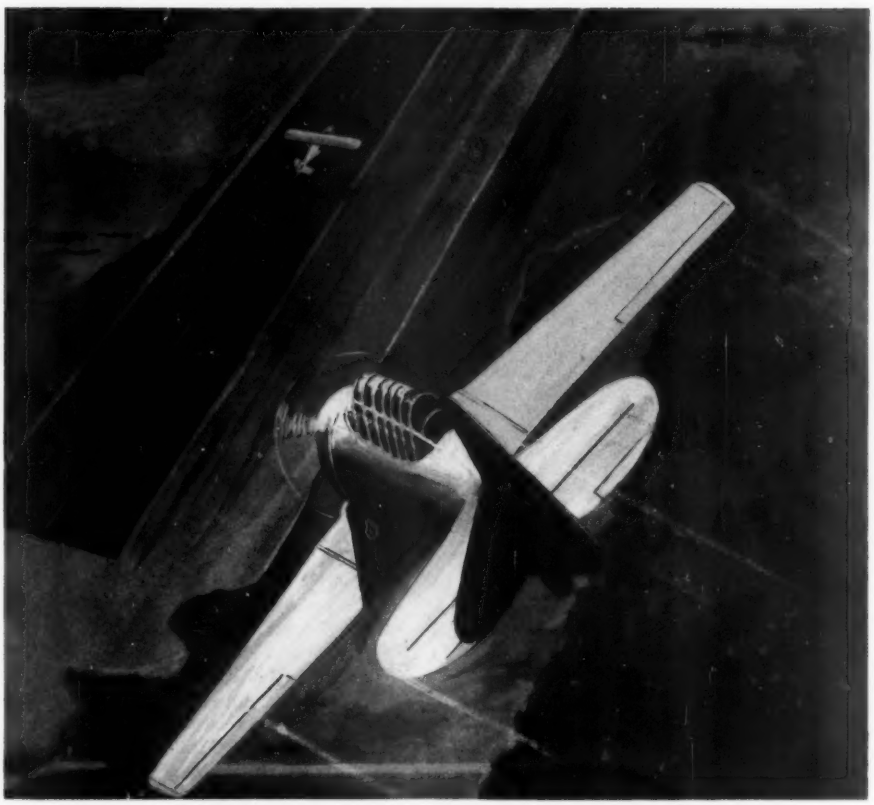
Complete standard specifications are contained in Radio Technical Commission for Aeronautics documents DO-144 and DO-138, available for examination at any FAA regional office. They also may be purchased from the RTCA Secretariat, Suite 655, 1717 H Street, N.W., Washington, D.C. 20006. The price is $6.00 for DO-144 (minimum operating characteristics), $8.00 for DO-138 (environmental conditions and test procedures).

Comments on the proposed transponder rule, NPRM 71-10, Docket No. 10955, should be submitted in duplicate to the DOT/FAA Rules Docket, GC-24, 800 Independence Ave., S.W., Washington, D. C. 20590. The deadline for comments is June 30, 1971. K. T.

With 550 wild horses locked up in that cowling, you need time to get the feel of the reins.

The WARBIRD Flyer

It may be legal to step directly from a Cub to the cockpit of an AT-6, but it is not safe unless you are properly trained.



Low and slow and steeply banked—a lethal combination in any high-powered airplane.

FORMULA FOR AN ACCIDENT

Ingredient A:

One young pilot, a prospective airplane purchaser, confident and eager; only 22 years old but with some 500 hours of accident-free time in the Cessna 170 he shares with his older brother; possessed with a love of airplanes in general and a secret obsession for warplanes. Since the P-51, his first love, lies out of his financial reach, he has focused his sights on the AT-6, with its massive radial engine and sliding canopy, and he has been diligently searching the classified ads for one he can afford.

Ingredient B:

Some 300 miles upstate, an airplane for sale; one old, but airworthy AT-6, the North American advanced trainer in which many World War II pilots won their wings. Single (but monstrous) engine, 550 hp Pratt and Whitney "Wasp"; top speed, 205 mph; two-place tandem with stick control; narrow hydraulically operated gear and flaps; fuel capacity 111 gallons (about 3 hours flying time); oil capacity, 9.5 gallons (repeat *gallons*); no radios, but lots of other knobs, handles, levers and controls, many of them in strange places; throttle quadrant on the left; powerful, temperamental, unforgiving.

Ingredient C:

One ex-military pilot, with many flying hours in a wide variety of aircraft, mostly military; learned to fly in the AT-6 during World War II and has a sincere affection for the one he owns. Hates to sell it, but needs the money (he is getting married); inexperienced as an instructor, but knowledgeable about all things flying, and amiably confident that one bird is pretty much like another.

Situation:

Late afternoon in early summer. Brothers have flown up in their 170 for a look at the AT-6; favorably impressed; with a handshake and an exchange of a check, the deal has been concluded. New owner asks about an instructor-pilot for a checkout, is told he will have to wait overnight. Previous owner assures young pilot this is not necessary—he can show him all there is to know about the old warbird in a few minutes. Older brother looks skeptical, but young pilot is eager to "just get the feel" of his new plane. After half a dozen touch-and-goes in the military trainer he insists that he is absolutely at home in it. The two brothers depart the airport at 4 p.m.

They have agreed to try to keep within sight of one another and in any case, to rendezvous over Harristown, 20 miles south of their home field, which is tower controlled. Their arrangement is to land in a "flight of two," with the 170 leading the AT-6 (which has no radio) down. No problem as they proceed along the downwind leg, but as they turn base, the AT-6 begins to overrun the leader, and as the latter turns on final, the military plane is obliged to extend his base leg well beyond the runway centerline.

As he sees his leader flaring for the landing, the AT-6 pilot banks sharply toward the runway, hoping he can line the plane up in time to touch down behind the other and not have to go around. He is watching his airspeed in the bank, of course, but in the gathering dusk the instrument is hard to read, and he gropes for

the instrument light switch under the panel . . . *it is not there.*

Result:

Airplane accident, fatal. Just west of the airport the AT-6 crashed and burned, having stalled during a steep banking turn from base leg to final approach. The pilot was killed. Although the probable cause was listed officially in the accident report as "failure to maintain flying speed," those who were familiar with all the background knew that the stage was set for this accident long before the pilot came within sight of the airport.

The first two "ingredients" were certainly harmless in themselves. There is nothing wrong with coveting a time-honored military airplane, provided that you can find one in airworthy condition that is within your economic grasp. And there is nothing wrong with making a "pet" out of an AT-6. The third ingredient contains the fatal taint of a challenge to the airman's pride: . . . "if you can fly one bird, you can fly them all."

In the AT-6 cockpit most controls are on the left: throttle, prop, mixture, trim, flaps, landing gear and wobble pump. That means a lot of new habits to learn—and some old ones to unlearn—for a civilian pilot.

Forward visibility on the ground is virtually non-existent; even with a padded seat you cannot see over the big cowling. The canopy is often left open until after takeoff for ventilation and quick exit in emergency.

This is not necessarily true. Different planes have different flying characteristics and varying performances, which can become very important in an emergency. Light modern civilian aircraft are specifically designed to be forgiving of pilot error, a feature which increases the safety factor and the sales appeal but offers little as preparation toward moving into an unforgiving plane. The difference between flying a 550 hp warplane and a 145 hp civilian airplane is considerable.

Having 500 hours or even 5,000 hours in a 170 or similar aircraft certainly means that you are an experienced pilot. But it also means that you have built up a specific set of habits with regard to flying which, although they keep you accident free in one type of aircraft, could contribute to a mishap or worse in another. Flying experience is, in part, specific; in fact, the problem of *unlearning* certain habits associated with hundreds of hours in a given plane can be the most difficult part about changing airplanes.

Another potentially fatal aspect of ingredient number three was the willingness of the ex-military pilot to act as an instructor—and the willingness of the younger pilot to accept the offer. Whether he did so out of a desire to save on the instructor's fee, or to save time, or simply out of pride in his own ability and a distaste for showing undue concern—this may never be known. The point is, instructing is a special art, not a mantle which can be draped over any experienced and proficient pilot.

The best pilot in the world may not have the aptitude for teaching anything about flying to another pilot. The instructor assesses your proficiency with a methodical patience that is not likely to be found among other pilots, and his judgment is worth waiting for and paying for. It is much cheaper than medical or mechanical bills.

Then there is the time factor, always a potentially deadly ingredient. Experience has its own clock; it will not be rushed. The moment the young pilot decided that he *could* not wait, overnight possibly, for an instructor in the AT-6; that he *had* to fly back with his brother; that they *had* to arrive before nightfall—in this moment he was setting obstacles for himself against which he was almost certain to stumble.

It may have been perfectly true, as he said, that he ". . . felt at home in the airplane"—in the daylight, yes. But who had given any thought to checking him out in a night landing? The homeward flight could have been delayed en route for any of a number of reasons, in which case the belated discovery that the instrument light switch on the AT-6 was not a knob under the panel on the right, but a facing toggle switch, might have been critical.

No formal checkout and no minimum number of hours of dual instruction time are required for transitioning from one aircraft to another in the same general category (single-engine land, multi-engine land, etc.) if no passengers are involved. To carry passengers a pilot is required to have a minimum of five takeoffs and landings within the previous 90 days. The readiness of a pilot to fly a different airplane safely depends not on any minimum legal requirement but on his ability to handle the aircraft in question. Even a pilot who was well-experienced in modern light planes might need ten, or even twenty or more, hours in an AT-6 to become proficient—and safe.

To begin with, the pilot of a modern airplane may have considerable trouble taxiing the high-nose AT-6 until he learns how to S-turn along the taxiway. Unless the rudder is trimmed for takeoff, the extra power of the 550 horses would present a problem to anyone unfamiliar with the heavy right rudder that must be held and the left rudder that is later needed when the power is cut for a landing.

The AT-6's main gear is narrow, making for a tendency to groundloop for the unwary. The canopy opens separately front and back. The narrow cockpit has gauges bunched closely on the panel and on the side and even on the floor, with a half-moon windshield.

The throttle quadrant is on the *left*, as is the flap handle, and the hand-operated "wobble-pump" used to prime the fuel before start. Just getting into the tall plane is a challenge; from the wing one steps up with the left foot and throws the *right leg* over—like mounting a horse.

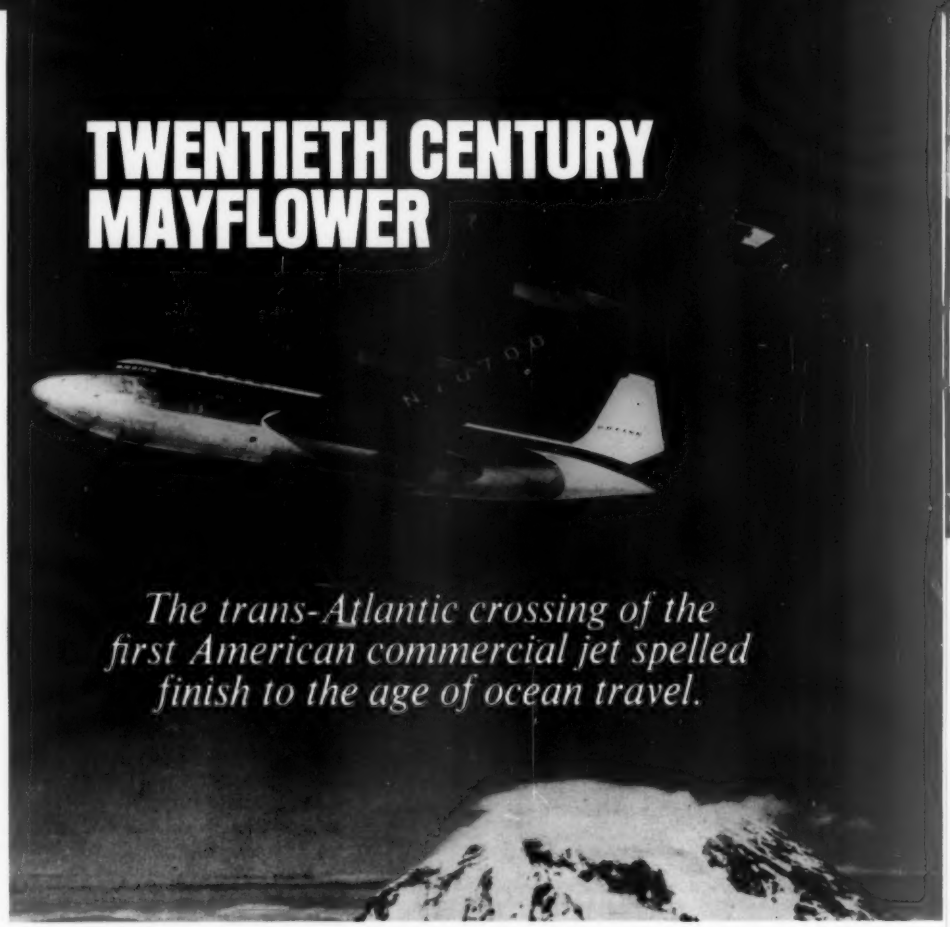
You handle the AT-6's stick with your *right hand*, since the throttle and prop control are at your left—the reverse, obviously, of most civilian arrangements. The book tells you that the stall speed in level flight is about 60 mph, but it does not tell you about the rapid sink rate when the engine is cut, nor the various control reactions that are peculiar to this aircraft. World War II veterans may tell you that there were more incidents among students who transitioned to AT-6's from slower trainers than among students who began on the big bird.

Warplanes are something like wild animals: beautiful but savage—and very expensive to own. If you have your heart set on taming one, get some professional help.

(FAA Advisory Circular AC 61-9 offers guidelines for pilots desiring to transition to complex single-engine and light twin-engine airplanes. Send 15¢ to Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. GPO order number: FAA 5.8/2:P 64/7.)

Famous
FLIGHTS

TWENTIETH CENTURY MAYFLOWER



The trans-Atlantic crossing of the first American commercial jet spelled finish to the age of ocean travel.

Flying above the clouds gave travelers the smoothest, safest journey ever known.

The date was October 26, 1958. The occasion was the inauguration of trans-atlantic jet service by a U.S. flag carrier—Pan American World Airways. The New York-Paris flight carried 111 passengers and a crew of 12 under the command of Captain Samuel H. Miller.

It was not the first scheduled jet flight across the Atlantic; a BOAC *Comet* had won that honor 22 days earlier. Nor were any great records set by the American jet. The flight took eight hours and 41 minutes, nearly three hours slower than the *Comet's* pace. (The 707 had to stop at Gander, Newfoundland, for an hour to refuel.) The aircraft was not even flying under its own name. N711PA, the third 707 off Boeing's assembly line, had been christened *Clipper Mayflower* but was temporarily named *Clipper America* for this one flight.

In a way, it was too bad the airline did not retain the original name. The contrast between the *Mayflower* of 1958 and its namesake of 1620 was startling. The *Mayflower* that carried the Pilgrims from Plymouth, England, to Plymouth, Massachusetts, was jammed with 101 passengers and 48 crew members on a voyage that consumed 96 days. The ship weighed 180 tons: the 707 weighed 123 tons on takeoff. (Today a fully-loaded Boeing 747 grosses 170 tons *more than the Pilgrims' old ship.*)

If Flight 114 was not first or fastest across the Atlantic, it still carved a niche for itself in aviation history. October 26, 1958, marked the start of an incredible decade in which air travel became the leading mode of transportation in the United States, and air transportation became the nation's seventh largest industry. The greater comfort, efficiency and safety of the jets were major factors, but speed was the most important factor of all. It meant not only less travel time for passengers but higher aircraft utilization and cheaper operating costs for the airlines—which, in turn, brought fares down to the point where the so-called "jet set" is now composed largely of middle-income passengers. It is interesting to note that the economy coach passengers on Flight 114 paid $489.60 for a roundtrip ticket, which today could cost as little as $300 (off season excursion fare).

So routine and prosaic has jet travel become, it is easy to forget the technical significance of Flight 114 and the aeronautical progress it represented. *Clipper Mayflower* flew from New York to Paris only four decades after Lindbergh's historical flight over the same route. It carried 20,000 gallons of fuel, compared to Lindbergh's 450, and consumed more fuel in the first three minutes of flight than the *Spirit of St. Louis* did on its entire trip.

Lindbergh's decision to take off was based on a single weather report which turned out to be so inaccurate that he admitted later he never would have left if he had known what lay ahead. Flight 114 had the benefit of data from a half dozen weather stations, two weather ships and about 20 airliners. The Boeing 707, crossing at 39,000 feet, also had the capacity to fly above virtually any weather disturbance en route. The $15,000 price tag on Lindbergh's tiny monoplane would not have paid for the 707's electronics gear. The Lone Eagle had 11 cockpit instruments; Captain Miller and his three flight deck colleagues had 211, not to mention four radios compared to none for Lindbergh.

Overtaking the Comet

Boeing's 707 jetliner was soon followed by the Douglas DC-8, and a few months later by the Convair 880. All three of the American commercial jets were larger and faster than the ill-fated British *Comet* (see FAA AVIATION NEWS, May 1971) and were soon in world-wide demand. Britain's bold effort to snatch the lead in the field of civil aircraft manufacturing was defeated with quiet but irrevocable finality on that day of the *Clipper America's* uneventful inaugural.

Some idea of the effect of that first jet flight on the public can be gained by consideration of a few statistics. Today, a dozen years after Flight 114, a scheduled jetliner crosses the Atlantic once every ten minutes during peak traffic periods. Transatlantic traffic now totals more than 3 million passengers annually, and the jets are carrying 12 persons for every one who travels by ship. Overall traffic in the United States leaped from 56 million passengers in 1958 to 180 million in 1969. When Flight 114 took off for Paris, there was only one airport in the United States with jet service: what was then New York's Idlewild. Jets now operate in and out of nearly 200 jet ports. Just one city, Cleveland, now generates more annual passengers than all the nation's airlines carried during 1940.

Flight 114 also ushered in a new era of safety. The brute strength of the jets was dramatically demonstrated only a few months after Pan American's inaugural trip when the autopilot on a sister 707 malfunctioned over the Atlantic, sending the aircraft into an uncontrolled dive from 35,000 feet. The jet plunged to 6,000 feet before its crew regained control and pulled out in a maneuver that subjected the aircraft to almost six times the force of grav-

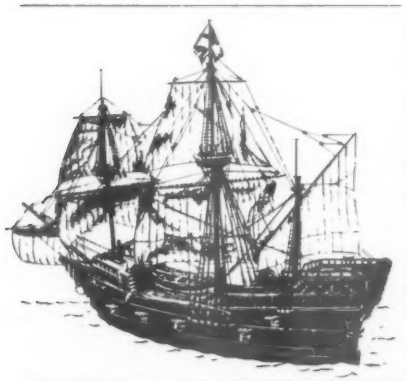
ity. Those *g* forces, it was determined later, actually exceeded Boeing's own design limits—they were so powerful that the captain's eyes were blackened as if by heavy blows. Despite damage to stabilizers, ailerons and wing panels, the 707 was sound enough to be flown later to Seattle for repairs.

The fatal crash rate for free world jets in 1959—their first full year of operations—was one for every 150,000 flying hours. The 1969 rate was one fatal crash for every 800,000 hours. The 1971 rate could hit the one-in-every-million mark.

As might be expected, Flight 114's debut was preceded by much hue and cry over the oncoming jet age. The critics, scoffers, and doubters challenged the necessity of cutting a few hours off long flights just for the "handful" of people who would use jets. They also predicted dire happenings for a radically different type of transport plane which some insisted was too large, too complex, too difficult to learn how to fly, too fast for air traffic control, too uneconomical to operate and too unsafe in the new and supposedly dangerous environment of the higher jet altitudes. None of these predictions came true. On the contrary, many airlines now have all-jet fleets for both long and short haul service, for everywhere jets are the preferred form of air travel.

The man who commanded Flight 114, Samuel Hudson Miller, first flew the Atlantice in a flying boat that took 30 hours to reach Portugal from New York. The historic jet first, New York to Paris, 8 hours and 41 minutes (normally flown in about 7 hours today), only whetted his appetite for speed. Now a Pan American vice president, Captain Miller looks forward to the day when no city in the world is farther than half a day's travel from another.

Robert Serling



Crossing the Atlantic in the original Mayflower required 66 days in 1620. The steamer Mauritania set a record of 4 days, 10 hours, 41 minutes in 1909.

BRIEFS

■ NEW POWER LINE WARNING LIGHTS. FAA has officially adopted a new standard for warning aircraft of the presence of power and other transmission lines, utilizing flashing sequenced lights on the supporting structures (see FAA AVIATION NEWS, April 1971 for complete details). The previous standard recommended positioning colored spherical balls on the wires and red tower lights. Pilots may expect to see the older system continued temporarily in some areas, since the standard is not obligatory. Check with AIM and your local FAA facility.

■ GETTING THE ANGLE. Flight instructors are urged to introduce student pilots early in their training to the approach slope indicators now available at many small and large airports. These systems, which inform the pilot whether he is above, below, or on the proper glide path, include the VASI (Visual Approach Slope Indicator), the AVASI (Abbreviated Visual Approach Slope Indicator), and the VAPI (Visual Approach Path Indicator).

Most indicators consist of red and white light displays for day and night use, although some simple devices are effective in daylight only. All are designed to aid pilots to maintain uniform final approaches. Part 1, Airman's Information Manual describes the arrangement and use of the VASI systems.

■ ASK AND YOU SHALL RECEIVE. A policy of increased flexibility in the air traffic control system has been ordered by FAA Administrator John H. Shaffer. Whenever operational conditions permit, controllers will approve requests for direct routes (in place of preferred routings), discontinue standard instrument departures, offer direct radar vectors, and assign the most economical altitudes for all types of aircraft.

The opportunity for easing the rigidity of air traffic procedures has come about because of a slackening in the air traffic activity over the past year. Operations using FAA facilities, which grew at a rate of 15 to 20 percent annually during the mid-1960's, levelled off in 1969 and declined slightly in 1970.

■ AIRCRAFT REGISTRATION RENEWALS. All owners of aircraft registered in the United States should have received FAA registration renewal forms by this date. The form (8050-73, "Aircraft Registration Eligibility, Identification, and Activity Report) must be filled out and mailed to FAA's Aeronautical Center by June 30 of each year. There is no fee. Non-renewed certificates may be revoked.

Aircraft owners who have not received the form 8050-73 for their aircraft should request one from the FAA aircraft registry, Department of Transportation, P. O. Box 25082, Oklahoma City, Okla. 73125

Positive Control Airspace Being Lowered to 18,000 feet

FAA is planning to lower the base of positive control airspace to 18,000 feet over the entire United States (except Alaska and Hawaii) in order to reduce the potential for midair collisions.

Positive control airspace currently extends from 24,000 feet to 60,000 feet, except in the northeast quadrant, where it was lowered to 18,000 feet in 1967. To operate in area positive control (APC) all aircraft must fly on an instrument flight plan and be equipped with a transponder.

Lowering the base will be accomplished in a four-step program, which began on May 27, 1971, with the area including all of Washington and North Dakota, most of Oregon, Montana, South Dakota and Michigan. Target date for lowering the positive control to 18,000 feet for the western states is July; for the southwest, September; and for the southeast, October 1971.

Lowering of APC to 18,000 feet over the adjacent 48 states has been under consideration for a number of years, but action was delayed until sufficient air traffic personnel and equipment were available to provide the necessary services. New controller hiring and continuing progress in the automation of the enroute air traffic control system has now made it possible to offer ATC separation for all flights above 18,000 feet.

Terminal Control Areas for New York, Los Angeles

Two new terminal control areas (TCAs) have been proposed by FAA as part of a long-range program to reduce the potential for midair collisions near congested airports. The proposals, which were drafted by FAA after public hearings and meetings with local airspace users, would be established at Los Angeles and New York.

An air traffic control clearance is required to fly in a TCA, and the pilot must have at least a private pilot's certificate, and an aircraft equipped with two-way radio, VOR or TACAN, and transponder.

The New York TCA would resemble a giant three-stemmed mushroom, with stems rising from Newark, LaGuardia and Kennedy airports. It would extend outward 20 miles from each airport. The Los Angeles TCA would be rectangular in shape, 20 miles (north and south) by 45 miles. The top of both TCAs would be 7,000 feet, with the base varying from ground level near the airports to 4,000 feet; special provisions will allow access to small airports within the TCA. At Los Angeles a VFR corridor would allow uncontrolled VFR aircraft to overfly the airport between 2,500 feet and 5,000 feet.

Comments on the New York TCA (Airspace Docket 71-WA-6) should be addressed to FAA, EA-500, JFK International Airport, Jamaica, N.Y. 11430. On Los Angeles, (Airspace Docket 71-WA-7) write to FAA, WE-500, Worldway Postal Center, Box 92007, Los Angeles, Calif. 90009. Deadline for comments is June 18, 1971.

1971 FAA Film Catalog Released

Recent films on area navigation, radio procedures, and medical facts for pilots have been added to the loan collection of FAA flight safety audio-visual materials, which includes 16 mm sound films, audio-slides, and filmstrips covering a wide variety of aviation-related subjects, All are available on loan from FAA at no charge.

The 1971 film catalog can be obtained free from DOT/FAA Distribution Unit, TAD 484.3, Washington, D.C. 20590.

Seventy ADAP Projects Approved for General Aviation Airports

In the first ten months of the Airport Development Aid Program (ADAP), FAA has allocated $6.1 million for 70 projects at airports serving general aviation exclusively, and $5.1 million for 17 projects at "reliever" airports which provide service for general aviation in the vicinity of high density air terminals.

An ADAP allocation, which is the first step leading to a Federal grant for an airport development project, generally provides funds on a 50-50 matching basis.

Recent ADAP Allocations to General Aviation Airports:

California: Hanford *(Municipal);* Quincy *(Gansnor Field)*
Delaware: Georgetown *(Sussex County)*
Florida: Kissimmee *(Municipal)*
Georgia: Alma *(Bacon County);* Claxton *(Claxton-Evans County);* Jekyll Island; Reidsville
Illinois: Greenville
Indiana: Anderson *(Municipal);* Valparaiso *(Porter County Municipal)*
Minnesota: Le Sueur *(Municipal)*
Mississippi: Magee *(Municipal)*
Missouri: Jefferson City *(Memorial)*
Nebraska: Holdrege *(Brewster Field Municipal);* Loup City *(Municipal)*
New Mexico: Santa Rosa *(Municipal)*
New York: Niagara Falls *(International)*
North Carolina: Elkin *(Municipal);* Franklin *(Macon County);* Oxford *(Henderson-Oxford);* Whiteville *(Columbus County)*
Ohio: Fostoria *(Metropolitan)*
Oklahoma: Oklahoma City *(Wiley Post)* (reliever); Walters *(Municipal)*
Pennsylvania: Allentown *(Allentown-Queen City)*
South Dakota: Wagner *(Municipal)*
Texas: Pampa *(Perry Lefors Field)*
Wisconsin: Baraboo *(Baraboo-Wisconsin);* Dells Hartford *(Municipal)*

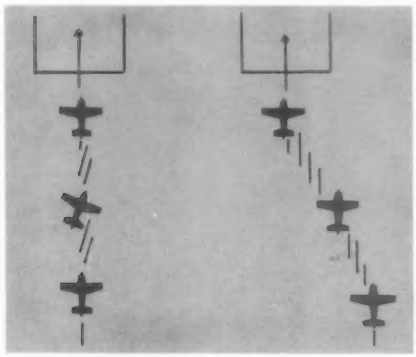
HEADSTAND. High wing and low wing aircraft got their blind spots together and collided over a Dallas runway recently while preparing to land. Luckily, injuries were slight, but vertical landing was hard on the airplanes. (Photo by Jack Beers, *Dallas Morning News.*)

FAA Aviation News welcomes comments from the aviation community. We will reserve this page for an exchange of views. No anonymous letters will be used, but names will be withheld on request.

• A Slip of the Pen

The article on "Wheelbarrowing" in the February 1971 issue of FAA AVIATION NEWS is a very fine one. I would like to point out, however, that the slip being used for crosswind approaches (in the drawing) is a side slip, and not a forward slip as stated.

Herrald E. Beaty
Van Horn, Texas



It is a side slip, technically, since the longitudinal axis of the airplane is shown parallel to the runway (right example). In a forward slip the nose of the plane would have been cocked to one side. See illustration above, from FAA's AC 61-21, p. 68. Our compliments also to Messrs. Maupin, Jacobs, Beard and others who spotted the slipup.

• Fire Prevention Comes First

In your Flight Forum article on "Fire Aloft" in the October 1970 issue you stated the FAA does not require engine fire extinguishing equipment in general aviation aircraft. You quoted the incidence rate as being less than 0.2 of one percent of all accidents, or 11 out of 4,929 accidents.

It would be interesting to know what the benchmark is before the agency airworthiness standards division decides fire extinguishing equipment is required.

R. Gerald Irvine
Albany, New York

We do not, of course, base the requirement for fire extinguishing equipment on any fixed incidence or fatality rate. The whole point we were trying to make was that many other fire protective measures are required, and that these are highly effective.

Any corrective action growing out of an accident would seek to prevent further occurrences of the trouble rather than require means to extinguish fire. The record indicates that prevention will make aircraft over 99 percent firefree.

• Ice on the Bow Tie

The conclusion of your article on "Winter Landing" in the February issue surprised me no end. I do not believe that the loan of warm clothing to an unprepared pilot is the responsibility of the FBO, unless he also reminds his pilots of the dangers of unprepared winter flight.

The FBO may not be able to stop the owner-pilot from flying in winter without necessary gear, but he shouldn't encourage it by loaning warm clothing to a man who comes to fly across country in below-freezing weather wearing only slacks and sport coat.

Matthew I. Howard, M.D.
Anchorage, Alaska

Our suggestion applied more to the transiting pilot who arrives in a chilling environment in unsuitable apparel. Most local citizens know better. See "Windchill" in the February 1969 issue of FAA AVIATION NEWS.

• Male versus the Female

FAA AVIATION NEWS is one of the most interesting and newsy publications I have seen. With regard to the article "Five Year Corporate Pilot Accident Record Reviewed" (September 1970), it would be interesting to add a comparison of air carrier, corporate and general aviation pilot-error accident records on the basis of hours flown and miles flown as well as on total number of accidents. Could you publish some figures on this? It would help to round out the picture.

Paul H. Albers
Massapequa, N.Y.

Your article on the safety record of women pilots (October, 1970) was highly inaccurate. It is silly to do such figuring on a basis of women pilots to men pilots. Why were air-miles left out of your study? Out of the same 700,000 male pilots how many of them fly for a living? Some of these men have flown millions of miles in their career. Most women pilots go up for a trip around the traffic pattern on Sunday. If women are involved in one third the amount of fatal accidents as men (proportionately) then it's probably because women fly less than one third as much! I would be interested in seeing a study based on men and women's log books.

Randy Smith
Sunnyvale, Calif.

Information on the number of hours or miles flown by any given group of pilots (whether classified by certificate, experience or sex) is not available, since no pilot is required to log his flying hours unless he is working toward an additional license or rating. We hope to see a statistical survey of this type of data undertaken soon. Incidentally, some experts feel that flying more hours per year is at least a partially self-cancelling factor, since frequent flying keeps the skill level high, and in turn reduces the probability of accidents, but it also increases the exposure to accidents.

• FSS Com Channels

I am a licensed Commercial Pilot working on my Instrument Rating. Upon reading the December 1970/January 1971 issue of AVIATION NEWS, I believe I found a possible error in the article "The 360 Channel Com Radio". On page 9 the caption reads, "Flight Service Stations (13 CH.) (122.0-122.75). By following the count of 50 kHz spacing as stated in the article, do you not have 16 channels between 122.00 and 122.75?

Edward Glospie
Ramsey, N.J.

Yes, there are 16 channels in that range but 3 of them (122.40, 122.50, 122.70) are "Tower Receive" channels, not used by FSS.

• Identity Crises

On page 14 of the December/January issue of FAA AVIATION NEWS there is an item entitled "Clarify Commercial Operator" which mentions a proposed amendment to the definition of a "Commercial operator" in Part I of the FARs. It appears that a pilot carrying "persons carried in furtherance of the business of selling to any of them land, goods, or property of any kind" would be required to adhere to commercial standards. As a private pilot utilizing single engine aircraft on business, I am apprehensive. I frequently have occasion to carry my customers to remote installations of our air pollution control equipment so that they may see it in operation and be assured of its effectiveness. This normally involves one to three passengers who do not pay for the trip. However, I probably would not take them if I were not in high hopes of selling them substantial amounts of equipment. Would the new regulation, if adopted, put a stop to these activities?

John Underwood, III
Atlanta, Ga.

The objective of the proposal is to clarify the present definition of a commercial operator. The proposed change, as written, could apply to the operation you describe in your letter. In the light of inquiries and other comments received, FAA is giving serious consideration to whether a change in the wording of the proposal is necessary or appropriate before taking final action on it. Your letter has been placed in the rule-making docket containing comments to NPRM 70-41.

• New Pattern Procedures

Concerning mid-air collision near controlled airports, I suggest that we consider revising our pattern procedures. Instead of the 45 degree entry and departure, I propose the following:

Incoming traffic would: (1) Descend to 1,000′ AGL whenever possible after contact with approach control, about 30 miles out, (2) proceed to an initial point (IP) two miles perpendicular to the center of the active runway on either side, depending on direction of approach to the field, and (3) contact tower at IP (right or left), then proceed per instructions to downwind on this 90° angle. After takeoff I suggest a 45° turn at 200′, right or left depending on directions of flight and tower approval, then no turns until 2,000′ AGL whereupon the trip bearing may be assumed.

This is meant for general aviation only and I think it would reduce situations conducive to collisions.

Vernon Hibbing
Paullina, Iowa

Your letter is very timely in that FAA is presently engaged in a review of our traffic pattern policies, procedures and regulations. Your comments will be considered during the course of this review along with others we have received on the subject.

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
WASHINGTON, D. C. 20590

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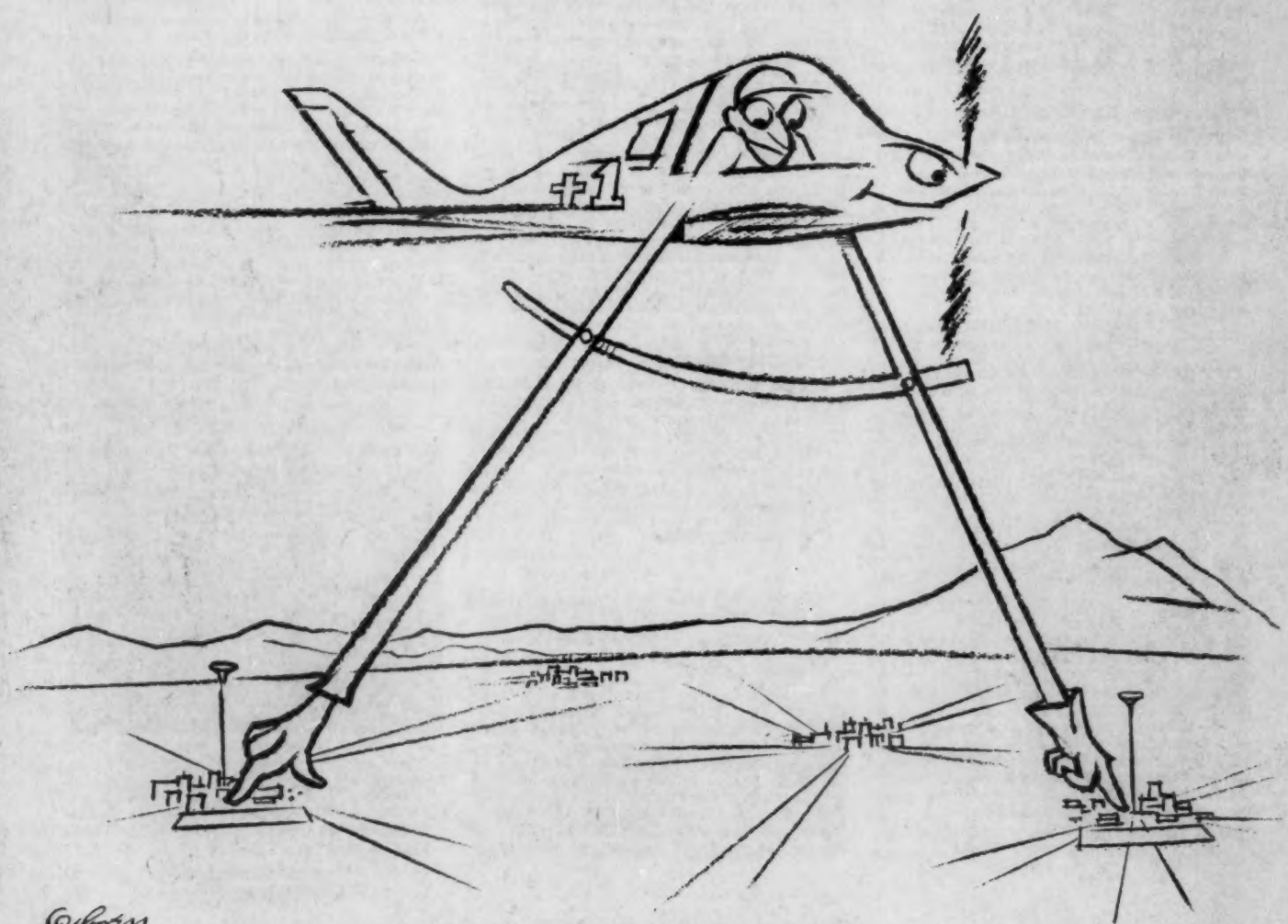
AVIATION SCHOOL LIBRARY

Navigation hazards are really but naught



Know where you are; be where you ought

Suggested by Richard L. Perez
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